In particular, the specific dynamic storage modulus (E') of Component B ensures the thermal deformation of the adhesive tape is sufficiently suppressed. Because Component B has a dynamic storage modulus (E') at 23°C of not less than 200 MPa and less than 400 MPa, the adhesive tape shows superior flexibility, thereby enhancing its followability to the object to which it is adhered.

The adhesive tape of the present invention exhibits fine winding workability equivalent to that of an adhesive tape having a polyvinyl substrate (PVC tape). As described in the specification, adhesive tapes using PVC as a substrate were previously widely used (e.g., as an insulating tape for electrical equipment). Adhesive tapes using PVC have a wide range of economical, as well as other, benefits, including fine flexibility and stretchability, flame resistance, resistance to thermal deformation, and electrical insulation (see, e.g., specification page 1, lines 7-24). However, because PVC is suspected of generating dioxin and toxic gas upon incineration, adhesive tapes using PVC are being replaced by adhesive tapes using other materials, which may not afford the same beneficial effects of adhesive tapes using PVC (see, e.g., specification page 2, lines 1-32). For example, conventional adhesive tapes having a polyolefin substrate exhibit relatively poor winding workability. The use of such conventional adhesive tapes having a polyolefin substrate results in the need for more frequent cuts and twists (e.g., when the tape is wrapped around the circumference of a number of bundled wires), which require additional time for tape winding. In contrast, adhesive tapes having a PVC substrate and the adhesive tape of the present invention show fine winding workability. Applicants can demonstrate to the Examiner in a personal interview with the Examiner, if desired, the significantly better winding workability of the adhesive tape of the present invention as compared to a conventional adhesive tape with a polyolefin substrate, as well as the similar winding workability of the adhesive tape of the present invention with respect to an adhesive tape using PVC.

The Pending Claims

Claims 1, 2, 6-12, and 15-20 are currently pending. The text of the pending claims is set out on an attachment hereto for the convenience of the Examiner.

Summary of the Office Action

Claims 1, 2, 6-12, and 15-20 remain rejected under 35 U.S.C. § 103(a) as obvious in view of Tucker et al. (U.S. Patent 5,498,476), either individually or in combination with Richardson et al. (WO 97/05206). Reconsideration of this rejection is respectfully requested.

Discussion of the Rejection

Applicants previously pointed out that the Tucker reference does not disclose Component B as recited in the pending claims and, therefore, that the present invention is unobvious in view of the Tucker reference. In response to Applicants' remarks, the Office contends that the Tucker reference discloses a propylene/ethylene copolymer and that the claimed physical properties of Component B are either inherently possessed by the product of the Tucker reference or an obvious optimization of the disclosure of the Tucker reference (Office Action, page 2). This rejection is traversed for the following reasons.

A. Dynamic Storage Modulus

As previously discussed by Applicants, the Tucker reference discloses ethylene-propylene copolymer (EP) rubber or ethylene-propylene-diene copolymer (EPDM) rubber as a propylene/ethylene copolymer, and merely describes the composition of the EP or EPDM rubber as comprising from about 50% to about 90% ethylene, from about 10% to about 50% propylene, and from 0 to about 3% diene (column 4, lines 20-31). The Tucker reference does *not* describe the dynamic storage modulus of the EP or EPDM rubber, which is an essential characteristic of the pending claims. The only specific example of an ethylene-propylene copolymer described in the Tucker reference is ethylene-propylene terpolymer (Epsyn 7506) (see, e.g., Example 1). The Rule 132 Declaration of Yoshio Nakagawa executed on September 26, 2002 (and submitted with Applicants' Response to Office Action dated September 30, 2002) describes experiments that determined that ethylene-propylene terpolymer (Epsyn 7506) did *not* satisfy the numerical range of the dynamic storage modulus recited in claims 1 and 12 of the present application.

However, the Office indicates that, since Applicants failed to disclose the exact monomer ratios of CATALLOY KS-353P, the comparison study in the Rule 132 Declaration fails to illustrate that the test was carried out under comparable conditions (Office Action, page 3). While the exact monomer ratio of CATALLOY KS-353P is unknown, the composition ratio is as follows: 30 wt% polypropylene (polymerized in the first step) and 70 wt% ethylene-propylene rubber (polymerized in the second step). Accordingly, Applicants believe that the tests were carried out under comparable conditions and that the dramatic differences in the thermal deformation of the adhesive at 100°C illustrates that the EP or EPDM rubber described in the Tucker reference does *not* inherently possess the dynamic storage modulus described in the claims of the present invention.

B. Multi-Step Polymerization

The Office further contends that the pending claims are product-by-process claims, and a process limitation must be evidenced as affecting the structure or chemistry of the resultant product over that of the prior art (Office Action, page 2).

A propylene/ethylene copolymer obtained by multi-step polymerization involving two or more steps (i.e., Component B of the present invention) is structurally different from the propylene/ethylene copolymers obtained by other methods (e.g., mechanical blending) as shown in the accompanying Rule 132 Declaration of Yoshio Nakagawa. Specifically, transmission electron microscope (TEM) photographs of a film made of a mixture of Component A of the present invention and Component B of the present invention were compared to a TEM photograph of a film made from a mixture of Component A of the present invention and Comparative Component B. For this experiment, Component A was an ethylene-vinyl acetate (EVA) copolymer (EVAFLEX P-1905). Component B was a propylene/ethylene copolymer obtained by multi-step polymerization involving two or more steps (CATALLOY KS-353P). CATALLOY KS-353P is a propylene/ethylene copolymer obtained by polymerization of a polypropylene (PP) component in the first step and polymerization of the ethylene-propylene rubber (EPR) component in the second step. Comparative Component B was a physical mixture (i.e., mechanical blend) of a PP component (NOVATECH FX3) and an EPR component (SPO VO-141).

As depicted in the TEM photographs provided in the Rule 132 Declaration, the film containing Component B of the present invention clearly differs from the film containing Comparative Component B. To be specific, the films differ in the phase separation structure of each constituent component (PP/EPR/EVA). Component B of the present invention has a phase structure (integrated structure) wherein the PP component and the EPR component are continuously linked. In contrast, Comparative Component B has a phase structure wherein the PP component and the EPR component are each individually present (i.e., the PP component and EPR component are independently phase separated).

Thus, as described in the accompanying Rule 132 Declaration, the propylene/ethylene copolymer obtained by multi-step polymerization involving two or more steps (i.e., Component B) is structurally different at a micro-level from a propylene/ethylene copolymer obtained by another method (e.g., mechanical blending). The adhesive tape of the present invention affords the beneficial effects described above due to this microstructure.

Additionally, support for the differences between the propylene/ethylene copolymer obtained by multi-step polymerization involving two or more steps (i.e., Component B) and a copolymer (polymer alloy) obtained by a conventional blend method (such as those known in the prior art) is provided in the accompanying References 1-3. Reference 1 is the "Application

of CATALLOY Soft Polypropylene Resin to Film Field," COVERTECH 1998.3, pages 12-14; Reference 2 is Technical Material CATALLOY; and Reference 3 is Polypropylene Handbook, pages 261-262 (5.5.3 Reactor made thermoplastic polyolefin elastomer). An English language summary of References 1-3 is submitted herewith along with the copies of References 1-3.

For the above reasons, the Tucker reference does not teach or suggest Component B of the substrate of the present invention, as recited in the pending claims. In particular, the Tucker reference does not teach or suggest a propylene/ethylene copolymer obtained by multi-step polymerization involving two or more steps, let alone a propylene/ethylene copolymer that has a dynamic storage modulus (E') at 23°C of not less than 200 MPa and less than 400 MPa, a dynamic storage modulus (E') at 80°C of not less than 40 MPa and less than 180 MPa, and a dynamic storage modulus (E') at 120°C of not less than 12 MPa and less than 70 MPa.

Moreover, combining the disclosure of the Tucker reference with the disclosure of the Richardson reference would not allow one of ordinary skill in the art to arrive at the present invention. As described above, the Tucker reference does not teach or disclose Component B of the pending claims, and the Richardson reference does not remedy the deficiencies of the Tucker reference.

The Richardson reference discloses a pressure sensitive adhesive tape comprising a tape body coated on one side with an adhesive. However, the Richardson reference does not teach or suggest a polypropylene/ethylene copolymer as a component of the tape body. Accordingly, the Richardson reference does not teach or suggest defining the dynamic storage modulus of a propylene/ethylene copolymer to a particular range or preparing a propylene/ethylene copolymer by multi-step polymerization involving two or more steps, as recited in the pending claims.

Therefore, the combination of the Tucker reference and the Richardson reference does not teach or suggest Component B of the substrate of the present invention, as recited in the pending claims. Accordingly, one of ordinary skill in the art would not have conceived of the constitution of the adhesive tape of the present invention, much less the specific action and effect as described above that are afforded by this constitution, from the disclosure of the Tucker reference or the combination of the Tucker and Richardson references. For this reason, the obviousness rejection is improper and should be withdrawn.

C. Metal Hydroxide as a Flame Retardant

Additionally, the Office has noted that Applicants have not responded to the rejection that the use of a metal hydroxide as a flame retardant is well known in the art (e.g., the Richardson reference) (Office Action, page 3). Claims 9 and 18 recite the feature that the flame retardant is a metal hydroxide. Claim 9 is dependent on claim 1, and claim 18 is

adhesive tape and a substrate therefor which are novel and unobvious in view of the prior art. Claims dependent thereon include the features of claims 1 and 12 and, therefore, similarly recite novel and unobvious subject matter. Accordingly, Applicants respectfully request the withdrawal of this rejection.

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

John Kilyk, Jr., Reg. No. 30,763
LEYDIG, VOIT & MAYER, LTD.
Two Prudential Plaza, Suite 4900
180 North Stetson
Chicago, Illinois 60601-6780
(312) 616-5600 (telephone)
(312) 616-5700 (facsimile)

Date: March 7, 2003

Certificate of Mailing Under 37 CFR 1.10		
"Express Mail" Label Number: EV 195512393 Date of Deposit: March 7, 2003 I hereby certify that this "Response to Office Action" and all accompanying documents are being deposited with the United States Postal Service "Express Mail Post Office To Addressee" Service under 37 CFR 1.10 on the date indicated below and is addressed to: Commissioner for Patents, Washington, D.C. 20231.		
Rick D. Madsen		March 7, 2003
Name of Person Signing	Signature	Date